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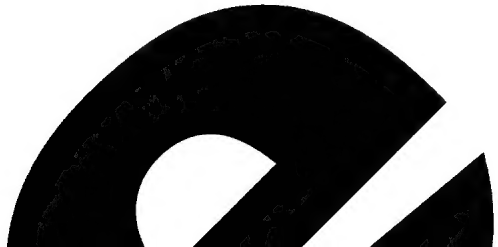

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DIRECTORATE OF
INTELLIGENCE

Intelligence Memorandum

Soviet Liquefied Natural Gas for the United States?

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
February 1972

INTELLIGENCE MEMORANDUM

SOVIET LIQUEFIED NATURAL GAS FOR THE UNITED STATES?

Introduction

1. A consortium of three US companies – Texas Eastern, Tenneco, and Brown & Root – is considering entering into an arrangement to import Soviet liquefied natural gas (LNG), beginning in 1978, at a rate of 1 billion cubic feet (cu. ft.) per day and increasing to 2 billion cu. ft. per day by 1980.(1) The gas would come from deposits in Western Siberia, and, if delivery proceeds well, imports might eventually be increased to 4 billion cu. ft. per day. The companies would undertake to finance construction of an all-year LNG terminal and liquefaction plant at a Soviet port,(2) a pipeline from the gas fields to the port, and up to 20 LNG tankers. The total capital cost is expected to be in the neighborhood of $4.2 billion – $2 billion for ships and ship terminals in the United States and $2.2 billion for field facilities, pipelines, and an LNG plant in the Soviet Union. Of the latter figure, the USSR would contribute $0.6 billion, probably mostly in domestic labor and materials, and would try to obtain Western credits for the remaining $1.6 billion. The proposed facilities would be utilized to full capacity at 2 billion cu. ft. per day and larger deliveries would necessitate further investment. The consortium anticipates that the LNG will be priced at about 50¢ per 1,000 cubic feet at the Soviet port, and $1.25-$1.50 per 1,000 cubic feet landed on the US East Coast.

2. The present memorandum assesses the probable reliability of the USSR as a source of such imports into the United States. In doing so it will examine the availability of gas for export from the Soviet Union and

1. 1 billion cu. ft. per day equals 10 billion cubic meters (cu. m.) per year.
2. Riga on the Baltic Sea, Murmansk on the Barents, or Arkhangel'sk on the White Sea have been mentioned as possibilities.

Note: This memorandum was prepared by the Office of Economic Research.

the terms on which such export would be economically feasible for the USSR. More specifically, it will consider: (a) reserves of natural gas in the USSR, especially those in Western Siberia; (b) problems of producing and transporting gas from these reserves to an export port; and (c) the likelihood that the gas might be diverted to meet other commitments, either for domestic consumption or for export to Eastern or Western Europe.

Conclusions

3. The USSR almost certainly will be capable of supplying the United States with 2 billion cubic feet per day of liquefied natural gas by 1980, if US credit, equipment, and technical assistance are available. Enormous high-quality gas reserves have been found in Western Siberia, but Soviet technology is poorly suited to cope with the severe terrain and climatic problems and to supply the kind of equipment needed to bring the gas to market. Acquisition of US technology and equipment thus would facilitate not only export of LNG to the United States, but also long-term development of the Soviet petroleum industry in the area, and probably of other industries as well.

4. The quantity of gas proposed for sale to the United States represents only about 4% of estimated Soviet supply in 1980, an amount that probably could be made available even though it was not previously taken into account in tentative long-range plans. Consideration is already being given to increasing Soviet imports of low-cost gas from Iran, beyond currently planned levels, and, if necessary, adjustments could be made through increased use of coal by large energy consumers such as the electric power and metallurgical industries.

5. The proposed prices of 50¢ per 1,000 cu. ft. at a Soviet port and $1.25-$1.50 per 1,000 cu. ft. delivered on the US East Coast appear favorable for both the USSR and the US consortium, although perhaps rather costly for the US consumer. The price at the Soviet port is nearly 50% higher than the prices of around 34¢ per 1,000 cu. ft. at which the USSR has contracted to deliver gas, via pipeline, over roughly twice the distance to Western Europe. The proposed price for Soviet gas delivered to the US East Coast is 1-1/2 to 2-1/4 times the proposed landed cost of 67¢ to 84¢ per 1,000 cu. ft. for LNG from Algeria, although the distance that the Soviet gas must be transported is only about one-fifth longer than that for the Algerian gas.

6. With the proceeds from the sales to the United States, the USSR could repay anticipated foreign indebtedness for field facilities, pipelines, and an LNG plant in the Soviet Union within six or seven years. Thereafter,

it would earn (and the United States would pay) some $365 million per year, an amount about equal to present hard currency earnings from Soviet exports of oil. Over the portion of a 20-year agreement remaining after debt retirement, Soviet earnings would total at least $4.7 billion.

7. The desire to realize such earnings of hard currency probably constitutes the best guarantee that the Soviet Union would be a reliable supplier. Moreover, the USSR has a good record of honoring contractual obligations and has a stable government. The proposed US purchase of Soviet LNG would give both countries a vested interest in continued cooperation.

8. Although unforeseen, temporary domestic shortages might force the USSR to decrease deliveries of LNG to the United States to make gas available for use at home, prolonged diversion to such use does not seem likely unless Soviet-US political relations deteriorate seriously. Diversion for export to other non-Communist customers appears even less likely, as it is doubtful that other Western countries would accept gas diverted from the United States.

Discussion

Soviet Gas Reserves

9. The USSR unquestionably has extensive reserves of natural gas. In a speech before the Supreme Soviet on 27 November 1971, A.K. Kortunov, Minister of the Gas Industry, indicated that "explored" reserves[3] now total about 16 trillion cu. m. (565 trillion cu. ft.)[4] This would be a 75-year supply at the current rate of production. Soviet estimates of explored reserves, however, are based on insufficient drilling and are

3. The Soviet concept of "explored" reserves is broader than the US concept of "proved" reserves. Under the US definition, proved reserves are established on the basis of drilling and include only the crude oil and natural gas liquids recoverable from known deposits under existing economic and operating conditions. Soviet "explored" reserves are inferred or estimated on the basis of less extensive drilling, and capability for economic extraction is not a requirement for inclusion.

4. 1 cu. m. equals 35.3 cu. ft.

often grossly inflated.(5) Soviet reserves that have been proved by drilling and are available for production probably amount to only some 3 trillion cu. m., about a 14-year supply at the current rate of production. By way of comparison, in 1970 proved reserves of natural gas in the United States were estimated at 8.2 trillion cu. m., about a 13-year supply, and proved reserves in the world as a whole totaled approximately 45 trillion cu. m.

10. The location of Soviet gas reserves is a major problem. Kortunov noted that about 80% are located east of the Urals Mountains, whereas 70% of the consumption occurs 2,500 to 3,000 kilometers (1,500 to 1,900 miles) to the west in the European USSR. At least half of the explored gas reserves are located in permafrost regions of West Siberia (in the Ob' River delta), and about one-fourth of the total are found in the deserts of Central Asia. Most of the remainder lie in the Ukraine, North Caucasus, and Urals-Volga Regions in the European part of the country.

11. Most Soviet gas is rich in methane and has a high calorific content. However, the gas of Central Asia reportedly has some highly corrosive properties, and that of Western Siberia in most cases is accompanied by sand and water.

12. During the past five years, the Soviet Union claims to have discovered 15 giant gas fields; 10 of these are located in the Ob' River delta of Western Siberia and are expected to be major producers. However, none of the latter have yet been developed, because of the overlying permafrost, which complicates drilling, production, and pipeline operations.(6)

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5. For example, negotiations for sale of Soviet gas from Sakhalin to Japan were suspended in 1970 when [redacted] reserves of gas in Sakhalin were actually only 16 billion cu. m. and not 60 billion cu. m. as had been claimed in official Soviet statistics. The actual reserves of gas would have been inadequate to supply Japan with 2.4 billion cu. m. annually for 20 years as had been discussed in the negotiations. As an alternative the USSR has suggested that Japan participate in developing gas deposits in the Yakutsk area of East Siberia and take repayment in gas, but thus far Japan has been unwilling to make the large investment required.

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Similarly, in 1968 the estimate of reserves in the Kalmyk ASSR was reduced from more than 50 billion cu. m. to about 15 billion cu. m. Downward revision of the estimated Vuktyl gas condensate reserves also has caused plans for 1975 production from these reserves to be reduced from 40 billion cu. m. to 15 billion cu. m.

6. The difficulty of extracting natural gas in permafrost areas is well illustrated by the case of the Tazov gas field, one of the major fields in West Siberia. Failure to insulate the well casing in permafrost resulted in the warm gas melting the permafrost causing the casing to collapse and extensive cratering of the area. As a result a huge amount of gas was lost, and the USSR no longer lists this field as one of the country's most important gas deposits.

13. Other factors affecting the development of these deposits are poorly consolidated sand reservoirs in the Siberian structures, the presence of natural gas liquids that must be disposed of, and the formation of gas hydrates that freeze at the well head and stop the flow of gas. In addition, Soviet engineers are faced with the formidable problem of building long-distance, large-diameter pipelines over permafrost and difficult terrain to move the gas to major consuming areas in the European part of the USSR. It is from these West Siberian fields, however, that most of the gas must come to satisfy the anticipated growth in domestic demand during the remaining years of the decade.

14. The gas for the proposed sale of LNG to the United States also must come from these West Siberian deposits, although it is not clear which of several fields in this area is the most likely source. The large Medvezh'ye field is estimated to contain 1.0-1.5 trillion cu. m. of explored reserves and is scheduled to be producing 35 billion cu. m. annually (3.5 billion cu. ft. per day) by 1975. Gas from Medvezh'ye would have several advantages for the LNG project. It is high in methane content (98%) and is situated some 2,000 to 3,000 kilometers (1,200 to 1,900 miles) from possible export ports on the White, Barents, or Baltic Seas. Although this is a considerable distance, pipeline distances to other deposits would be even greater (see the map). However, Soviet planners have already scheduled the Medvezh'ye field for extensive development during 1971-75 and are counting on it to provide about one-fourth of the increase in total Soviet gas output for the period. It is likely that this gas probably is already allocated in the plan, mainly to domestic uses.

15. The large Urengoy deposit, some 200 kilometers east of Medvezh'ye, is estimated to contain 2-5 trillion cu. m. Gas from this deposit has tested 84%-91% methane. Unfortunately, however, it also is said to contain large amounts of condensate (natural gas liquids) which would be technically difficult to process and which would necessitate considerable additional investment in equipment.

16. Among the more thoroughly explored and densely drilled deposits, those of Zapolyarnyy, approximately 100 kilometers northeast of Urengoy, and Gubkin and Komsomol'sk, about 100 kilometers to the south, appear to be the best potential sources for the LNG proposed for sale to the United States. Information on these deposits is summarized in the following tabulation.

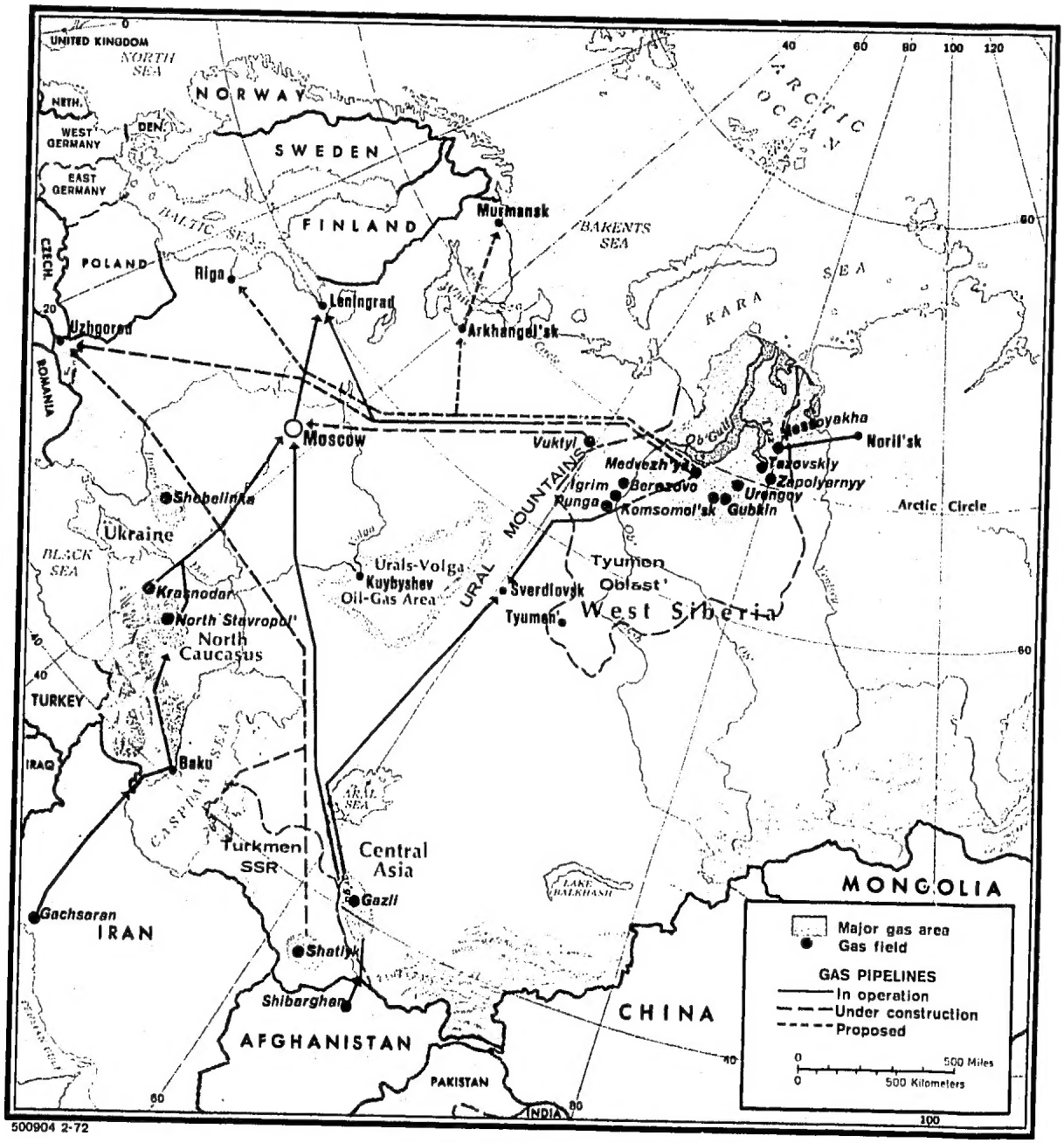
Deposit	Methane Content (Percent)	Number of Wells Drilled	"Explored" Reserves (Billion cu. m.)
Zapolyarnyy	98	24	1,500
Gubkin	96	31	352
Komsomol'sk	97	28	74 to 377

None of these fields would require drilling to depths of more than 1,350 meters. The methane content of all is high. The most promising candidate for supplying the United States with LNG would appear to be the Zapolyarnyy deposit. Its reserves are large enough to appear to be a reasonable source for the proposed US imports of up to 40 billion cu. m. per year (4 billion cu. ft. per day) for a prolonged period, even allowing for the usual Soviet over-estimation of reserves and the possibility that production difficulties could lead to a relatively low rate of recovery, perhaps only about one-half of the claimed reserves. Moreover, its proximity to the Ob' and the Tazov Gulfs would facilitate summer delivery of pipe, drilling rigs, and other equipment required during development.

Production Levels: Present and Planned

17. The USSR produced slightly less than 200 billion cu. m. of gas in 1970, and preliminary data indicate a production of about 212 billion in 1971. It ranks second in world output, accounting for approximately one-sixth of the total, but is well behind the United States, which in 1970 produced 620 billion cu. m., 54% of world output. The gap between Soviet and US gas production, however, is closing. During 1966-70 the annual rate of increase in Soviet natural gas production was 9.2%, about 45% greater than that in the United States.

18. In 1975 the USSR plans to produce 320 billion cu. m. of natural gas, an ambitious goal in light of the gas industry's chronic failure to fulfill plans throughout the past decade. Attaining the target for 1975 will require an average annual rate of growth of about 10% during 1971-75 and an annual increment in output of 24 billion cu. m. (2.4 billion cu. ft. per day), about 70% more than the average increase of 14 billion cu. m. per year (1.4 billion cu. ft. per day) attained during the previous five years. About one-half of the Soviet production of natural gas in 1970 came from four large deposits: Shebelinka in the Ukraine, Krasnodar and North Stavropol' in the North Caucasus, and Gazli in Central Asia. However, all of these gas fields have reached their peak levels of production, and



production from them will decline in the future, perhaps at the rate of 6% or 7% annually. With production from the older fields declining, achievement of the 1975 goal will be heavily dependent upon development of reserves that thus far have been only partly explored, primarily the reserves of West Siberia and Central Asia. Current plans call for bringing gas from the Turkmen SSR, in Central Asia, to the Ukraine to supplement supplies for local use, for transmission to the Moscow area, and for export to Eastern and Western Europe – at least until more West Siberian gas becomes available for these purposes.

19. As yet, nothing resembling a firm plan for production of natural gas in 1980 is available. Three or four years ago, articles in Soviet technical journals mentioned 550-600 billion cu. m. as a tentative target for 1980 production, but no such discussion has been noted recently. In view of the extremely difficult production and transportation problems to be overcome as a greater share of the gas comes from West Siberia, an annual output of over 500 billion cu. m. by the end of the decade is by no means certain. Attainment of this level would require an average annual increment during 1976-80 of 36 billion cu. m. (3.6 billion cu. ft. per day), more than 2.5 times the annual increases now being achieved. A considerable injection of foreign equipment and technical assistance would, of course, improve chances for reaching an annual production of 500 billion cu. m. or more by 1980.

Production Problems

In the Older Producing Regions

20. Ability to offset the decline in reserves and to stabilize production in the older producing regions of the European USSR will depend to a large degree on improving capability for deep drilling to exploit new reserves that occur at depths of 2,500 to 5,000 meters (8,200 to 16,400 feet). Soviet turbodrilling equipment now used for 80% of the drilling becomes inefficient at depths of more than 2,000 meters (6,600 feet). A similar deep-drilling problem also exists in Central Asia.

In the New Producing Regions of West Siberia

21. In the permafrost regions of northern Tyumen Oblast, the area from which LNG for the United States would come, a different set of production problems will be encountered. Although Soviet turbodrills, mud pumps, and mud systems may be adequate for average needs in the western part of the country, they are ill-suited for permafrost conditions and the tapping of possible high-pressure gas reservoirs in the far north. Lack of reliable high-pressure mud pumps and blowout preventors will make gas

well drilling particularly hazardous in this area. The temperature and composition of drilling fluids is extremely important in permafrost drilling if ground thaw, subsidence, and loss of the well and equipment are to be avoided. Soviet drilling rigs are made of tubular steel, rather than of angle-iron as in the United States, and are extremely heavy and bulky. One of the newer "portable" models requires as many as 12 tractors to pull it, a factor that will cut down mobility in slightly thawed permafrost or swampy areas. Soviet drill pipe also is heavy and made of lower quality steel than its US counterpart. Impurities, flaws, or hairline cracks are magnified in severe cold, which makes the steel more brittle and subject to failure. The life of Soviet drill bits also can be expected to be extremely short under the conditions that will be encountered in Siberian drilling.

22. Practically all of the deposits of northern Tyumen consist of loosely consolidated sand and clay reservoirs with a water drive. This condition is almost certain to create problems with hydrates and perhaps severe abrasion of all tubular steel used in production. Thus, in addition to developing methods for preventing ground thaw during drilling and around producing wells or operating pipelines, Soviet technicians must equip and produce wells in a manner designed to minimize formation of hydrates (or in some cases of natural gas liquids) in the producing column and at the wellhead. If the wells are permitted to flow properly, these liquids can be removed at the surface prior to pipeline transport. If they are not, well apertures may be clogged and flow rates reduced. Shutting down production to correct these problems or for other maintenance during times of severe cold will increase the danger of hydrate freezing and may result in cracked or split valves and wellhead control fittings.

Pipeline Transport Problems

23. Development of the West Siberian gas fields for domestic supply and for export will entail laying large quantities of large-diameter (48-inch and 56-inch) linepipe. The current Five-Year Plan commits the Ministry of the Gas Industry to construct 57,000 kilometers of pipelines during 1971-75, consisting of 27,000 kilometers of oil pipeline and 30,000 kilometers of trunkline for gas. This is an extremely ambitious target, almost a two-thirds increase over the 35,000 kilometers laid during 1966-70. Moreover, the shortages of large-diameter pipe, valves, and compressors that led to chronic underfulfillment of pipeline goals during the 1960s will continue to exist. Fulfillment of the goal will require at least 16 million tons of pipe, which exceeds the total of currently planned imports and domestic production capability during the five-year period by about 6 million tons. Perhaps one-third of the target for gas line – that is, about 10,000 kilometers – is associated with exploitation of the West Siberian gas deposits.

24. Thus far, Soviet technicians have not solved problems associated with thawing of the permafrost, nor have they conducted sufficient research on soil conditions to insure safe construction of pipelines in the Arctic. Temperatures in West Siberia may fluctuate from -70°F. to +100°F., and surface winds can gust up to 90 miles per hour. Both factors have led to repeated failures and breaks in the pipeline constructed above ground between Messoyakha and Noril'sk, the only commercial-sized gas pipeline above the Arctic Circle. Warm weather causes the line to expand and chafe on its supports, the pilings shift, and sections of the line fall off the supports and break. High surface winds have also caused sections to vibrate and rupture. Soviet linepipe is made with thick walls of poor quality steel that becomes quite brittle at -40°F. and is susceptible to breaking on any impact. The same problem affects the quality of Soviet valves which are prone to failure in Arctic service. Soviet welding is also not adequate for Arctic service, and defective welds are known to have been a frequent cause of pipeline failures.

25. Plans previously called for production during 1971-75 of linepipe 2,520 millimeters (99 inches) in diameter for use in connecting the gas fields of northern Tyumen Oblast with consuming centers in the Moscow-Leningrad area. However, these plans were abandoned in 1971 following initial tests of an experimental section near Vuktyl. The 2,520-millimeter line was expected to carry 90-100 billion cu.m. per year. The alternative now would appear to be construction of three or four pipelines each having a diameter of 1,420 millimeters (56 inches), but this will increase the requirement for steel linepipe, valves, and compressors – items already in short supply.

Availability of and Requirements for Gas

26. Any attempt at relating the availability of gas in the Soviet Union to possible requirements in the last years of this decade and during the next must be highly conjectural. As indicated above, achieving the goal for production of 320 billion cu. m. of gas in 1975 will be difficult, and production of more than 500 billion cu. m. by 1980 appears unlikely. There is little basis for estimation of production beyond that date. The USSR is, however, well endowed with natural gas reserves – even allowing for overestimation – and production probably will continue to grow.

27. In 1970 the Soviet Union was a net importer of gas, importing a total of 4.6 billion cu. m. of low cost gas from Afghanistan and Iran, primarily to satisfy local demand in areas contiguous to those countries, and exporting a little over 3 billion cu. m. to Eastern Europe and Austria. By 1975, however, the USSR is scheduled to become a net exporter of gas, and by 1980 it probably will have a net export surplus of some 20

billion cu. m., not including any possible sales to the United States. In the latter year, total exports of about 40 billion cu. m. probably will be divided almost equally between non-Communist and East European countries (see the table).

28. In recent years the share of the cheaper and more efficient fuels -- oil and gas -- in total Soviet consumption of energy has been increasing, primarily at the expense of coal. The share of natural gas alone rose from 17% in 1965 to almost 21% in 1970. During these years, industry consumed about 85% of the total supply of natural gas, with electric powerplants being the largest users, followed by the metallurgical and construction materials industries. Further increases in gas consumption are called for during the current Five-Year Plan, especially in the chemical and metallurgical industries and in the communal household sector.

29. The quantity of natural gas available for consumption in the USSR increased at an average annual rate of about 9% during 1966-70, and it is estimated that this yearly rate of growth will continue through 1980. The supply of gas probably will increase from about 200 billion cu. m. in 1970 to some 480 billion in 1980, as shown in the following tabulation:

	Billion Cubic Meters			
	1965	1970	1975	1980
Production	127.7	197.9	320	500 a/
Imports	0	+4.6	+14	+15 to +25
Exports	-0.4	-3.3	-20 to -23	-36 to -43
Available for consumption	*127.3*	*199.2*	*311 - 314*	*472 - 489*

a. Estimated output, based on present conditions without assistance. Preliminary plans indicated a goal of 550-600 billion cu. m.

Should production not reach these projected levels, the shortfall probably would not be large enough to create serious problems.

30. We have no quantitative projections for gas production after 1980 when most of the proposed LNG deliveries to the United States would

Soviet Trade in Natural Gas

Billion Cubic Meters

	Actual 1970	Estimated 1975	Estimated 1980
Exports	*3.3*	*20 - 23*	*35.5 - 43*
Non-Communist countries	1	8.0 - 11.0	16.5 - 24
Austria	1	1.5 - 3.0 a/	1.5 - 3.0 a/
Finland	0	0.5	1.5
France	0	0.5 b/	2.5
Italy	0	4.5	6.0
West Germany	0	1.5 - 3.0 a/	3 - 7
Subtotal to Western Europe		8.0 - 11.0 c/	14.5 - 20 c/
Japan	0	2 b/	2 - 4
United States	0	0	10 - 20 b/
Communist countries (Eastern Europe)	2.3	12	19
Bulgaria	0	3	5
Czechoslovakia	1.3	3	5
East Germany	0	3	3
Hungary	0	1	3
Poland	1.0	2	3
Imports	*4.6*	*14*	*15 - 25*
Afghanistan	2.6	4	5
Iran	2	10	10 - 20 d/

a. Discussions are under way that may result in receipt of the larger volumes of gas shown.
b. Agreements remain unsigned, therefore not included in export totals.
c. Soviet supplies of gas to Western Europe will represent only about 5% of Western Europe's estimated demand for gas in 1975 and 1980.
d. In recent months the USSR has been considering doubling the present commitment to import 10 billion cu. m. from Iran in 1980. Such an increase, however, will require construction of a second pipeline.

take place, although Soviet production undoubtedly will continue to increase. It is possible that technology and equipment provided by US firms in connection with the LNG arrangement not only would provide West Siberian gas for export to the United States but also would increase output of gas from this region for domestic use. Increased imports of gas from Iran, now being considered by the USSR, would be another means of expanding Soviet gas supplies. If, in spite of increased production and imports, domestic requirements should exceed supply, major Soviet consumers -- such as the electric power and metallurgical industries -- could use more oil or coal. Production of coal could readily be increased, and plans already exist for building large thermal powerplants that will burn low-cost strip-mined coal from deposits east of the Urals. If the USSR places a high enough priority on exporting gas to earn foreign exchange, any necessary adjustments probably will be made.

Some Price Comparisons

31. The proposed prices of the LNG, about 50¢ per 1,000 cu. ft. at a Soviet port and $1.25-$1.50 per 1,000 cu. ft. landed on the US East Coast, appear quite favorable both for the USSR and for the US consortium, but perhaps not for the US consumer. As indicated previously, the gas probably would come from fields in the Ob' River delta and would be transmitted by pipeline about 2,000 kilometers to Arkhangel'sk or perhaps some 3,000 kilometers to the ice-free ports of Murmansk or Riga. The USSR has entered into long-term contracts to deliver gas from essentially the same area over a distance of some 5,000 kilometers to Western Europe for around $12 per 1,000 cu. m. (34¢ per 1,000 cu. ft.)(7). Sale at this price over the greater distance to Western Europe indicates that the anticipated price of 50¢ per 1,000 cu. ft. at a Soviet port is quite generous for LNG destined for the United States.

7. At the end of November 1969 the USSR entered into a 20-year agreement to supply natural gas to West Germany. Deliveries will be via a pipeline through Czechoslovakia, to begin at 500 million cu. m. in 1973 and increase to 3 billion cu. m. per year within six years. The exact price of the gas has not been announced, but unofficially has been indicated as being in the vicinity of $11.84-$12.16 per 1,000 cu. m. delivered at the Czechoslovak border.

In December 1969 the USSR and Italy's national hydrocarbon monopoly, ENI, signed a 20-year agreement that reportedly calls for delivery of Soviet gas to Italy to begin in 1973, with deliveries increasing gradually thereafter to 6 billion cu. m. annually in about three years. The gas reportedly will be valued at approximately $11.20 per 1,000 cu. m. at the Italian border.

These prices are slightly lower than the export price of gas from the Netherlands the price of British North Sea gas consumed in the United Kingdom, and of Algerian LNG delivered to the French port of Fos. Hence, they can be regarded as competitive in Western Europe.

32. To complete the comparisons, it is worth noting that negotiations are now under way whereby Algerian LNG would be purchased at 30.5¢ per 1,000 cu. ft. f.o.b. the Algerian port of Arzew and landed on the US East Coast at 67¢ to 84¢ per 1,000 cu. ft., depending on the season, port of entry, and volumes involved. (The distance from Algeria to US East Coast ports proposed for deliveries is about 15%-20% less than that from Soviet ports under consideration.) US technical journals have indicated that deliveries of LNG from Nigeria would be feasible only at a price of $1.00 or more per 1,000 cu. ft. Deliveries from the latter source probably would cost somewhat more than deliveries of LNG from Venezuela, Trinidad, or Ecuador. Domestic gas from the southwestern United States, the most likely source of supply, is expected to cost East Coast distributors 60¢ to 75¢ per 1,000 cu. ft. by 1978-80. The cost of gas delivered from the Canadian Far North or from the Alaskan North Slope probably would fall in the range of $1.10 to $1.25 per 1,000 cu. ft. (Delivery from Alaska to Chicago at a price of 95¢ per 1,000 cu. ft. has been discussed, but delivery of this gas to the East Coast seems unlikely.) Synthetic gas made from Pennsylvania coal might be available at a cost of $0.75-$1.00 per 1,000 cu. ft. by 1980, or, if synthetic oil is produced in conjunction with the gas, this price range probably could be reduced by about 15¢.

Debt Retirement and Foreign Exchange Earnings

33. Texas Eastern has tentatively estimated the capital costs of the proposed LNG arrangement at about $4.2 billion, distributed as follows:

	Billion US $
In the USSR (Field facilities, pipelines, LNG plant)	2.2
Outside the USSR (Shipping)	2.0
Total	*4.2*

The consortium has stated that the USSR must finance the total cost – $2.2 billion – of facilities on Soviet soil. The USSR will contribute $0.6 billion of this total, probably mainly in domestic material and labor, and the consortium has volunteered to help obtain financing for the balance. The USSR, however, has indicated a reluctance to pay more than 6% interest.

34. If deliveries take place at the suggested rate of 1 billion cu. ft. per day during the first two years and 2 billion cu. ft. per day thereafter, the 50¢ per 1,000 cu. ft. mentioned as the possible cost of the gas at a Soviet port would be adequate to permit repayment of $1.6 billion at 6% interest per year within about six and one-half years. If the interest rate should be as high as 8%, this delivery schedule would permit repayment in a little over seven years. After repayment of the debt, the USSR would be earning $365 million per year, which could be used to finance imports of US equipment and technology.(8) This amount is approximately equal to present annual earnings of hard currency from Soviet exports of oil, which in recent years have been the largest single source of such earnings for the USSR. During the proposed 20-year life of the agreement, Soviet earnings over and above the amount required for debt repayment would total more than $4.7 billion.

35. As the initial system is expected to be capable of handling only 2 billion cu. ft. per day at full capacity, increasing the quantity of LNG imported to 4 billion cu. ft. per day, as is being contemplated for some later date, would necessitate investment in additional facilities. Whether doubling the US imports would bring about a corresponding increase in Soviet earnings would depend on costs and terms negotiated at the time.

36. There has been some discussion that the USSR may share half of the operating expenses of the LNG tankers. Should this be the case, presumably this contribution would come from a Soviet share in the $0.75 to $1.00 per 1,000 cu. ft. that has been estimated as the necessary allowance for fixed charges and transportation costs outside of the USSR.

Reliability of Supply

37. The USSR probably can be regarded as being as reliable a source of supply as almost any foreign country if the technical problems of extracting and transporting the gas can be overcome. It has extensive gas reserves and many resources at its command with which to overcome difficulties that might interfere with deliveries. It also has a stable government. The Soviet record of honoring contractual obligations has been good and probably will continue to be good, barring any drastic change in the international political climate. In entering into long-term contracts to purchase gas from the Soviet Union, the Austrians, West Germans, and Italians have concluded that this will be the case, and the French and Japanese apparently have no hesitation about negotiations that may lead to similar contracts.

8. The USSR has indicated willingness to use the earnings for purchase of US goods. Whether all funds earned will be so used will depend on final negotiations.

38. A glance at the map will suffice to indicate that the possibility of diverting gas destined for a liquefaction plant at Riga, Murmansk, or Arkhangel'sk cannot be avoided. The gas will flow through part of the same system that will be supplying the Moscow and Leningrad areas. Temporary, critical domestic shortages might force the USSR to decrease deliveries of LNG to the United States to make gas available for domestic use. Complete or prolonged interruption of exports, however, does not seem likely. Exports to the United States would be only about 4% of Soviet domestic supply in 1980. It is probable that once the liquefaction and export facilities were built, the USSR would wish to keep them operating at capacity, and it is unlikely that other Western countries would accept gas diverted from the United States.

39. The USSR has a growing requirement for technology, machinery, and equipment from the West. Its exports to developed non-Communist countries, however, have failed to keep pace with the growth in its imports from these countries. The deficit in Soviet trade with hard currency countries has averaged more than $300 million per year over the past decade. Deficits are financed primarily by Western long-term credits, and total outstanding Soviet indebtedness to the West by the end of 1971 was estimated at more than $2 billion. The burden of servicing this debt has become substantial and may soon force a slowdown in Soviet imports from the West. This is a major Soviet motive for seeking Western credits for export-oriented production. The best guarantee of the reliability of Soviet deliveries of LNG to the United States will be the fact that these gas exports will afford the USSR opportunity to earn foreign exchange that can be used to finance further imports of Western technology and equipment.

Some Considerations of Relative Advantage

40. It is generally conceded that under current economic conditions and policies the United States will become increasingly dependent on foreign sources of supply for energy. According to calculations by the National Petroleum Council, by 1980 foreign sources may satisfy nearly half of the US market demand for oil and perhaps one-third of the demand for natural gas. Other estimates place the dependency on foreign sources somewhat lower, but are in agreement that unless domestic reserves with a potential for supplying energy at higher cost are to be exploited, imports will account for an increasing share of the US energy supply. Most US energy imports probably will come from the Middle East, Africa, Canada, and Latin America. The proposed imports of LNG from the USSR would afford some slight diversification of supply but would not be large enough to affect significantly dependence on the other sources.

41. US equipment and technology provided under the proposed LNG arrangement undoubtedly would help the USSR to solve the many problems associated with development of Siberian gas fields and the transport of gas for the LNG deal itself. Moreover, earnings from the sale of LNG to the United States would, after the initial period of debt retirement, make possible further imports of technology and equipment for use in general development of the Soviet oil and gas industry, and probably other industries as well. The LNG arrangement would create mutual vested interests in the United States and the USSR. The United States would be interested in continuing to receive the gas (at reasonable prices) and to sell equipment. The USSR would be interested in earning foreign exchange, especially for the purchase of technology and equipment.

42. The major disadvantage in the LNG proposal, from the US point of view, would appear to be the high level of prices that have been mentioned thus far. Although a high price undoubtedly increases the Soviet incentive to be a reliable supplier, the prices under discussion may be higher than necessary and higher than the price of gas from other sources.